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# Supplemental Material

# Estimating Time-Varying PCB Exposures Using Person-Specific Predictions to Supplement Measured Values: A Comparison of Observed and Predicted Values in Two Cohorts of Norwegian Women

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**Table S1**: Agreements of predictions for PCB-153 concentrations with measurements in separate simulations in which individual information was disregarded for one or several variables. Dietary intake input parameters were replaced by group medians and other parameters were replaced with zero for all individuals. In simulations including individual parameterisation of all variables the rank correlation was 0.40 and 0.13, and median discrepancy was +4.8 and -3.3 for MISA and NOWAC women, respectively,

| **Static input value for:** | **Rank correlation $r_s$** | | **Median discrepancy** | |
|---|---|---|---|---|
| | **MISA** | **NOWAC** | **MISA** | **NOWAC** |
| Birth year | 0.27 | 0.13 | +5.31 | -8.47 |
| Duration of breastfeeding | 0.23 | 0.08[a] | +11.0 | -1.76 |
| Age at childbirth | 0.21 | 0.08[a] | +12.1 | -0.8 |
| No. of children | 0.21 | 0.08[a] | +12.1 | -0.8 |
| Age at childbirth and duration of breastfeeding | 0.21 | 0.08[a] | +12.1 | -0.8 |
| Dietary intake rates | 0.46 | 0.25 | +3.81 | -6.13 |
| Duration of breastfeeding and dietary intake rates | 0.37 | -0.21 | +11.7 | -1.0 |
| Age at childbirth and dietary intake rates | 0.29 | -0.31 | +11.8 | -0.55 |
| No. of children and dietary intake rates | 0.29 | -0.31 | +11.8 | -0.55 |
| Age at childbirth, duration of breastfeeding and dietary intake rates | 0.29 | -0.31 | +11.8 | -0.55 |

**Table S2:** Summary of predicted concentrations of 3 PCBs from the mechanistic model CoZMoMAN and their comparisons those measured in MISA and NOWAC women. Pearson`s correlation was calculated based on log-transformed concentrations.

| PCB cong. | Study group | Median prediction | Median discrepancy | Correlation $r_s$ | Correlation $r_p$ |
|---|---|---|---|---|---|
| 118 | MISA | 8.31 | 3.76 | 0.31 | 0.33 |
| | NOWAC | 17.6 | 3.66 | 0.15 | 0.14 |
| 138 | MISA | 15.8 | 0.44 | 0.35 | 0.39 |
| | NOWAC | 35.7 | -25.4 | 0.13ns | 0.14 |
| 180 | MISA | 17.9 | 0.01 | 0.38 | 0.39 |
| | NOWAC | 58.3 | -6.08 | 0.16 | 0.14 |

ns=not significant

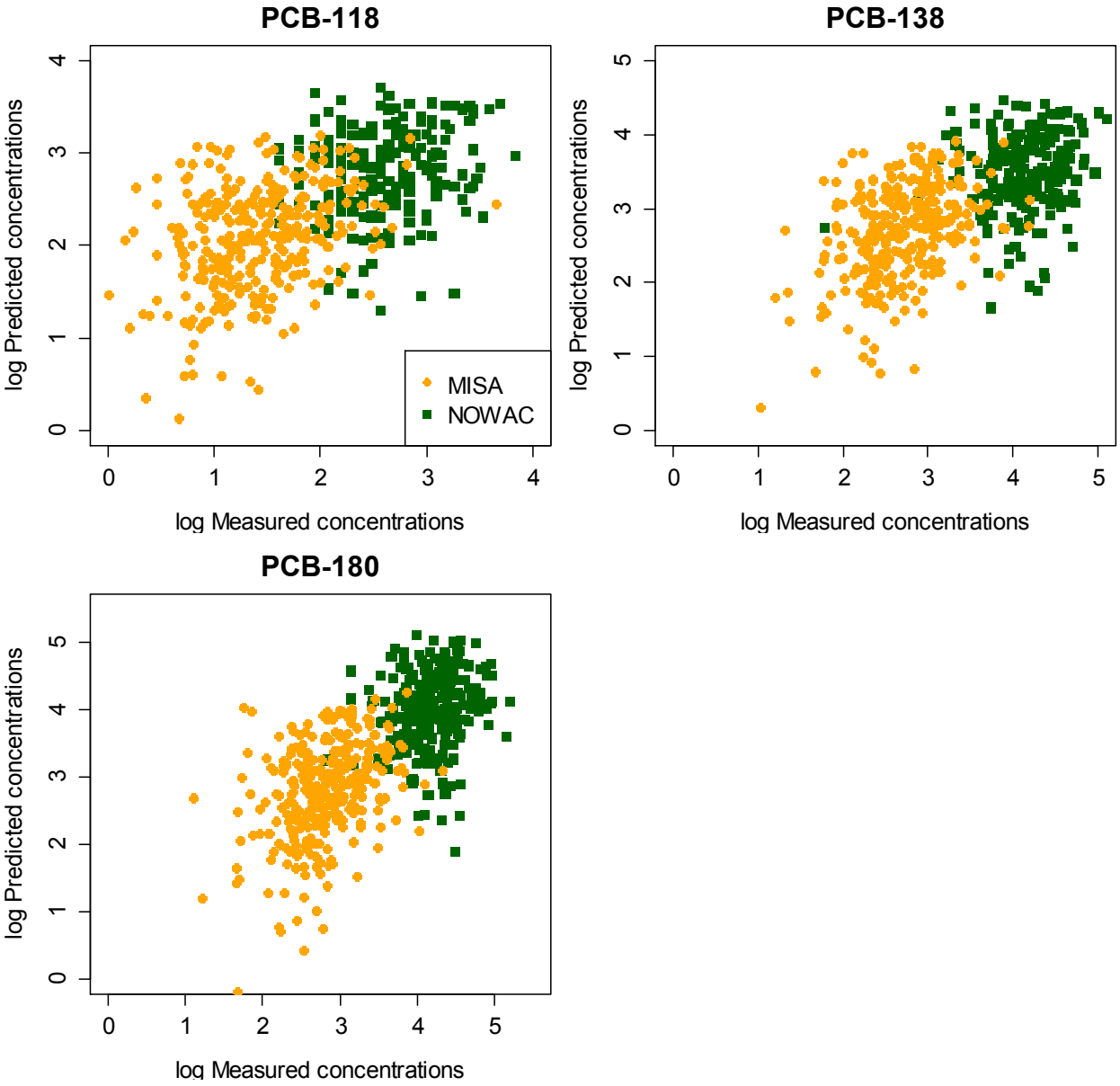


**Figure S1:** Measured serum concentrations (in ng/g lipid) of PCBs 118, 138 and 180 along with those predicted obtained from CoZMoMAN for the MISA (orange dots, *n*=310) and NOWAC (green squares, *n*=244) study subjects.

**Table S3**: Predictors of discrepancy between measured and predicted concentrations of PCB-153 for MISA and NOWAC women in linear regression models[a]. Models accounted for 50% and 56% of variations in model discrepancies for the MISA and NOWAC women, respectively.

| Predictor | MISA | | | NOWAC | | |
|---|---|---|---|---|---|---|
| | Coefficient estimate | SE[b] | p-value | Coefficient estimate | SE[b] | p-value |
| Birth year | 0.76 | 0.18 | 1.75e-05 | 2.92 | 0.53 | 7.56e-08 |
| Total breastfeeding | -0.88 | 0.18 | 1.68e-06 | 0.38 | 0.18 | 0.038 |
| Intake of fish[c] | 0.45 | 0.03 | <2e-16 | 0.83 | 0.05 | <2e-16 |
| Body weight | 0.22 | 0.06 | 5e-04 | | | |

[a]Intercepts for MISA and NOWAC models were significant. Further, levels of significance of predictors were as follows: '***'=p<0.001; '*'=p<0.05.
[b]SE = Standard error of estimate.
[c]Intakes represents summed fish intakes in g fresh weight/day.

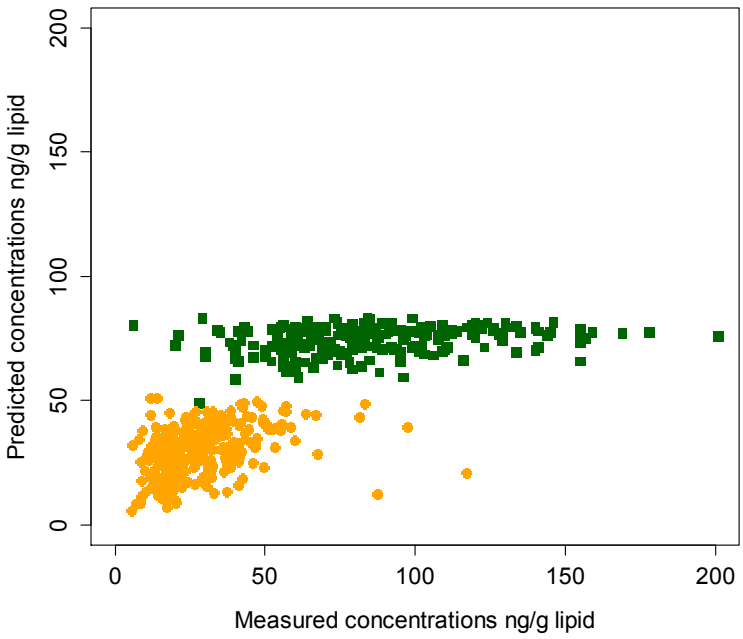


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**Table S4:** Predictors of measured PCB-153 concentrations in linear regression models[a] of the MISA and NOWAC study subjects. The models for the MISA and NOWAC women accounted for 36% and 22% of variations in concentrations, respectively.

| | MISA | | | NOWAC | | |
|---|---|---|---|---|---|---|
| Predictor | Coefficient estimate | SE[b] | p-value | Coefficient estimate | SE[b] | p-value |
| Birth year | -1.49 | 0.15 | <2e-16 | -2.86 | 0.51 | 8e-08 |
| Duration of breastfeeding (mths) | -1.29 | 0.15 | 5e-16 | -0.95 | 0.18 | 3e-07 |
| Body weight (kg) | -0.21 | 0.05 | 0.0001 | | | |
| Intake of fish liver | 11.0 | 3.24 | 0.0008 | | | |
| Intake of freshwater fish | 1.23 | 0.27 | 6e-06 | | | |
| Intake of summed fish | | | | 0.09 | 0.05 | 0.06 |

[a]Intercepts for MISA and NOWAC models were significant. Further, levels of significance of predictors were as follows: '***'=p<0.001; '**'=p<0.01; '*'=p<0.05; '.'=p<0.1.
[b]SE = Standard error of estimate

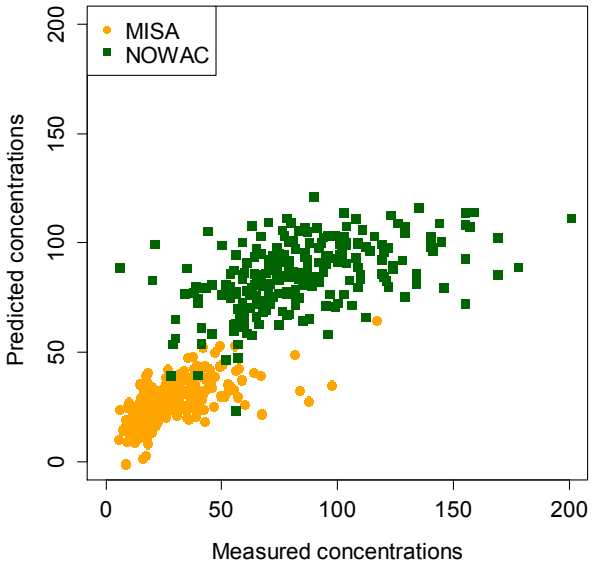


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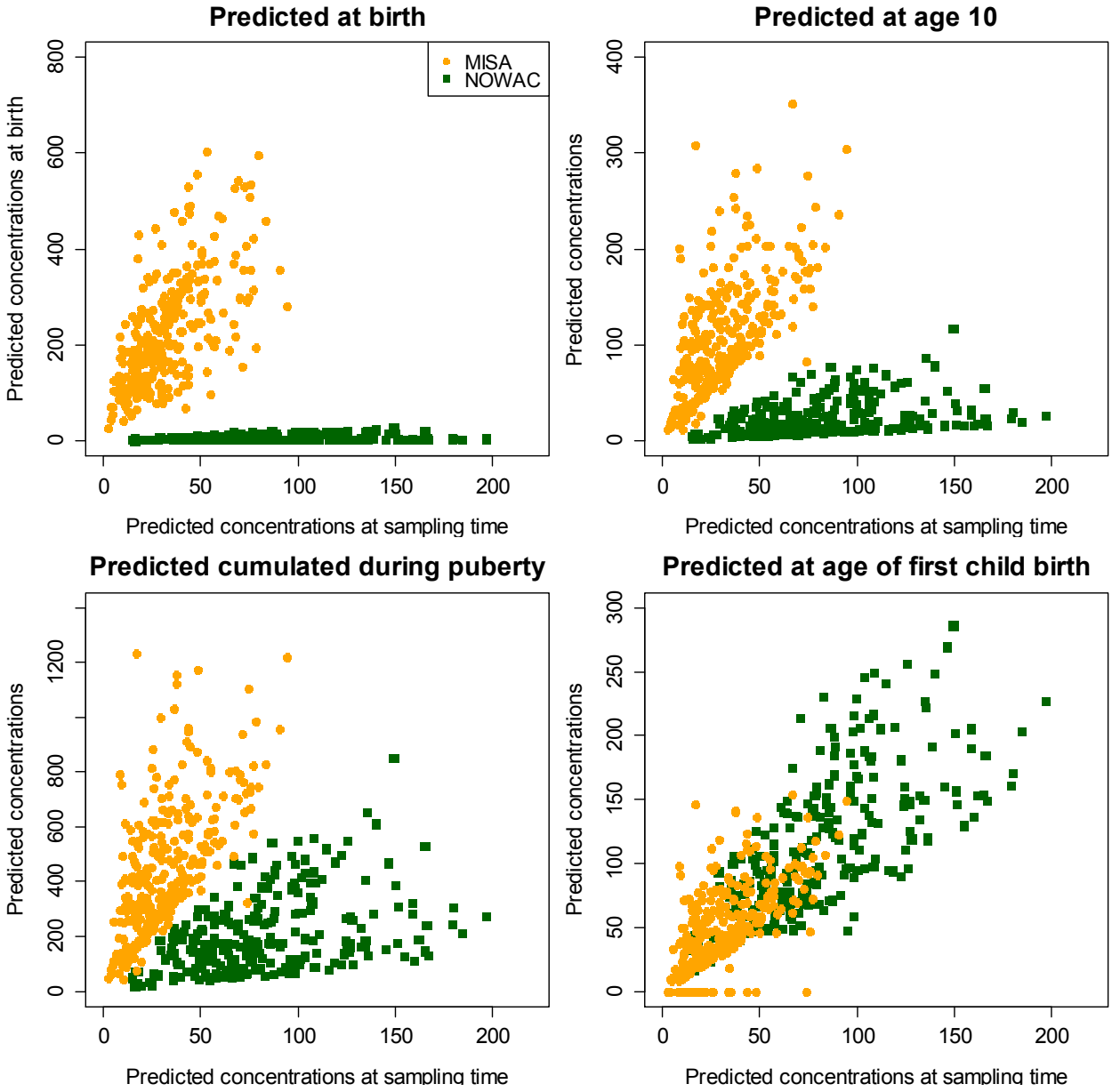
**Table S5:** Rank correlation $r_s$ between person-specific predictions of concentrations experienced in the past and at sampling time with the measured concentrations. The number of included women was 310 and 233 from the MISA and NOWAC studies, respectively.

| **Predictions of concentrations** | **Prediction at sampling time** | | **Measurement** | |
|---|---|---|---|---|
| | **MISA** | **NOWAC** | **MISA** | **NOWAC** |
| At birth | 0.68 | 0.27 | 0.05[a] | -0.32 |
| At 10 years | 0.65 | 0.39 | 0.29 | -0.31 |
| During puberty | 0.66 | 0.44 | 0.29 | -0.29 |
| At age of first child birth | 0.60 | 0.72 | 0.38 | -0.13 |

[a]Correlation was not significant

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